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# **Really “Lost in translation”?**

## **The economic consequences of issuing an annual report in English**

*Thomas Jeanjean*

HEC Paris, France

*Hervé Stolowy*

HEC Paris, France

*Michael Erkens*

HEC Paris, France and University of Trier, Germany

Corresponding author: T. Jeanjean, (+ 33) 1 39 67 72 86, [jeanjean@hec.fr](mailto:jeanjean@hec.fr).

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# Really “Lost in translation”?

## The economic consequences of issuing an annual report in English

<p><b>RESUME :</b> Dans ce papier, nous examinons les conséquences économiques de l'utilisation de l'anglais dans le rapport annuel de sociétés de pays non-anglophones. Utilisant un échantillon de 166 sociétés qui commencent à publier un rapport annuel en anglais en plus d'un rapport annuel dans leur langue locale, nous montrons que l'asymétrie d'information (mesurée par la fourchette de prix) est réduite, le suivi des analystes augmente et le nombre d'investisseurs étrangers est accru. Nos résultats sont obtenus dans le cadre d'une analyse d'une « différence dans les différences ». Pour contrôler le phénomène d'endogénéité, nous mettons en œuvre une procédure d'appariement « par score de propension ». Nos résultats suggèrent que la langue en tant que telle contribue à une augmentation de l'efficacité des marchés en fournissant davantage d'information.</p>	<p><b>ABSTRACT:</b> In this paper, we investigate the economic consequences of using English as an external reporting language for firms from non-English speaking countries. We use a difference-in-differences technique to estimate the effect of language. We use a sample of 166 firms that start publishing an annual report in English in addition to an annual report in their local language. We benchmark these firms to a sample of control firms defined via a propensity score matching procedure to control for endogeneity in the choice of the reporting language. We show that information asymmetry (measured as the bid-ask spread) is reduced, analyst following is enlarged and a greater investor base (measured as a higher number of foreign investors) is attracted. Our findings suggest that language <i>per se</i> may contribute to an increase in market efficiency by providing information accessible to more market participants.</p>
<p><b>Mots-clés :</b> rapport annuel, conséquences économiques, traduction, anglais, fourchette de prix, suivi des analystes, actionnariat étranger, différences dans les différences, score de propension.</p>	<p><b>Keywords:</b> annual report; economic consequences; translation; English; bid-ask spread; analyst following; foreign ownership, difference-in-differences, propensity score matching.</p>

## 1. Introduction

Over the past decades several changes in reporting and financial regulations have become effective and forced companies to provide significantly more detailed information in terms of required disclosures to external users. Besides press releases and more informal communication channels the most commonly used communication interface between a firm and its interested parties is still the annual report. Since smaller firms more often restrict their operating and geographical business area to their country of origin, their annual report is most often published in the language of the country where the company is incorporated. However, if the country of origin is a non-English speaking country, the information disclosed in the local-language annual report is, to put it baldly, not accessible to external users who cannot understand the reporting language. At firm level, one way out is to publish a second annual report in English, as the “lingua franca of international business is English” (Charles, 2007).

Given the increasing need to address a broad investor base and information intermediaries (such as analysts and brokerage firms), the question naturally arises as to the role of English as the reporting language of choice. Specifically, does an annual report published in English reduce information asymmetry and provide more useful – or even not yet priced – information to financial statement users, or are users in fact aware of all the information already available to the company’s domestic market?

In this paper, we attempt to answer this question by examining the economic consequences of using English as an external reporting language for firms from non-English speaking countries. The motivation for focusing on the role of (the English) language as an (additional) information transmitter rather than looking at the role of national and international GAAP is twofold.

First, we see a discrepancy between the management science/economics literature and the finance and accounting literature. In the past – and also very recently – researchers performed several investigations to study the effect of the English language at corporate level. They recognize that using a common language may facilitate trade and transactions (Mélitz, 2007, 2008), eases intercorporate relationships (Marschan et al., 1997; Marschan-Piekkari et al., 1999), and makes it more probable that multinational companies will export goods and services to foreign countries rather than running foreign production facilities, due to smaller communication costs (Brainard, 1997). Similarly, Grinblatt and Keloharju (2001a) remark

that “the firm’s language, culture and distance from the investor are three important familiarity attributes that might explain an investor’s preference for certain firms”.

In contrast to these studies in economics and management, almost no studies directly investigate the consequences associated with the use of a common language in the accounting and finance literature. At best, language (or cultural aspects, which are related) is seen as a possible explanation for a home investment bias (see, e.g., Coval and Moskowitz, 1999; Dvorak, 2005; Ammer et al., 2008), the superiority of country-specialized analysts over industry specialists (Sonney, 2009), more precise forecasts by local analysts compared to foreign analysts (Bae et al., 2008a; Bae et al., 2008b; Ramnath et al., 2008), a higher trading volume in local equity than foreign equity (Grinblatt and Keloharju, 2000, 2001a; Hau, 2001a, 2001b; Portes and Rey, 2005), higher proximity between the company and its local investor base (Brainard, 1997; Fuller-Love, 1998; Rauch, 1999; Grinblatt and Keloharju, 2001a, 2001b), lower information asymmetry (Brennan and Cao, 1997), and broader international ownership (Bailey et al., 2006; Alves and Ferreira, 2008; Kalev et al., 2008). However, none of these papers *directly* test consequences associated with the use of a specific language, even though Foy pointed out already in 1973 that “the annual report is one of the most important documents a publicly owned company produces” (Foy, 1973).

The second motivation for our study relates to comparability. The language used in the annual report is a crucial ingredient of financial information comparability. Proponents of accounting harmonization usually argue that common standards will enhance the comparability of financial statements, improve corporate transparency, and increase the quality of financial reporting. For instance, the adoption of International Accounting Standards or International Financial Reporting Standards (IFRS) is found to be associated with a lower cost of capital and transaction costs, a higher market value (Leuz and Verrecchia, 2000) and reduced home bias (Covrig et al., 2007). But this association between accounting harmonization and increased comparability in financial statements relies heavily on the assumption that market participants are able to read and *understand* any set of financial statements, as long as they are governed by the same accounting rules. It is noticeable that accounting is frequently referred to as a “common language” or the “language of business” in textbooks (Kim, 1995; Benston et al., 2006). However, the first barrier (before we even reach the question of accounting standards) to understanding and comparing financial statements and increasing transparency is the language barrier. In this respect, using English for external reporting purposes is the only way to address any outsider of the firm easily and directly, and to reduce the costs of information acquisition. These reasons make the language in which

annual reports are actually published an interesting setting to examine the effects of external communication policies on measurable economic consequences for the firm.

In this study we attempt to address this issue and try to identify the economic consequences of using English as an external reporting language for firms from non-English speaking countries. Specifically, we test the relationship between publishing an Annual Report in English (ARE)<sup>1</sup> and information asymmetry, plus analyst and investor behavior. We expect that firms issuing an ARE will benefit from (1) lower information asymmetry, (2) a larger analyst following, and (3) an enlarged and more international investor base. Our measures include median bid-ask spreads, analyst following and foreign ownership. To test our hypotheses, we use a sample of firms that decided to publish an ARE in addition to their local language annual report. We call these firms “adopters” (or treatment firms) in the rest of this paper, as they have adopted a new reporting policy. This sample is drawn from the Global Reports database, which identifies the language used by firms in their annual reports. From the initial database of 3,236 firms (10,278 observations), we identify 166 European firms which decided to publish an ARE in addition to their local-language report.<sup>2</sup> Cross-listed firms are excluded from our sample in order to avoid any confounding effect.

We begin our analysis by examining the relationship between publishing an ARE and information asymmetry. According to the market efficiency hypothesis, financial markets are “informationally efficient”, that is, prices on traded assets (e.g., stock prices) already reflect all known information, and instantly change to reflect new information (Fama, 1970). Since information asymmetry is present in financial markets, the efficient market hypothesis has already been empirically and theoretically disputed (see, e.g., Basu, 1977; Rosenberg et al., 1985; Fama and French, 1992; Chan et al., 2003). Moreover, it is obvious that a market can only be informationally efficient if information is understandable and accessible for (at least some) market participants. Since the English language makes it more possible and certainly easier to gather financial information published by the firm, we expect to find a negative connection between information asymmetry and the adoption of English as a reporting language. We argue that an ARE mitigates information asymmetry, which results in a lower median bid-ask spread. Our results support this hypothesis.

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<sup>1</sup> For the sake of simplicity, we use the expression “annual report in English” or ARE, in short, in the rest of this paper, to mean the English-language version of the annual report.

<sup>2</sup> For more information on our sample construction, see section 3.

Consistent with the predicted higher demand for analyst services in respect of internationally-oriented firms with an international ownership structure, we document a positive and significant association between a firm's decision to publish an ARE and analyst following. Since analysts serve as information intermediaries, their presence should tend to increase transparency.

Finally, we examine whether foreign ownership depends on the reporting language. We count the number of "foreign owners" (FO) for each firm-year observation. We expect that once a firm has decided to publish an ARE, it will attract more foreign owners. Our data confirm this hypothesis as well. Prior research has found that disclosure quality and visibility are important determinants of institutional investor ownership (Bushee and Noe, 2000; Dahlquist and Robertsson, 2001; Bradshaw et al., 2004). Since companies in foreign countries increase their visibility when they adopt an ARE, our results are in line with previous studies.

Our paper makes several contributions to the literature. First, we identify a new variable to explain information asymmetry. More precisely, we show that the publication of an ARE (in addition to the local language report) is associated with lower levels of information asymmetry, more analyst following, and a broader international ownership. While prior literature has identified the English language as a possible explanation for various phenomena observed in capital markets (home bias, institutional ownership, trading behavior, etc., see above), our paper is the first to directly address the question of the possible economic consequences of issuing an ARE. Second, we also add to the international accounting and finance literature. To explain information asymmetry, past literature investigated factors such as cross-listing (Bailey et al., 2006), the adoption of international accounting standards (Leuz, 2003), or legal institutions (Leuz et al., 2003). We show that language used in the annual report is a vehicle to ease the understandability of financial statements by users of information. More precisely, we document that the economic significance of language is far from being marginal: the adoption of an ARE has an effect on information asymmetry that compares with the effect of the adoption of international accounting standards (IAS/IFRS).

The rest of the paper is organized as follows. In the following section, we provide some background on annual report language and develop our hypotheses. Section 3 describes the methodology, variables and sample, and section 4 presents our empirical evidence. Section 5 concludes the paper and provides directions for future research.

## 2. Motivation and hypothesis development

### 2.1 Importance of language for financial statements users

As stated in the introduction, past literature concentrates on accounting as a language, not on the language used in annual reports *per se*. In this paper, we investigate whether the language used in the annual report has economic consequences. This investigation is based on the implicit assumption that the annual report is useful to investors.

The literature on accounting information generally holds the view that accounting and financial statement data are not the only source of information for capital markets (Gonedes, 1972; Emery, 1974; Gonedes, 1976). For example, insider trading sends information to capital markets (Seyhun, 1998). Analysts and rating agencies receive information before its publication in financial statements, and they transmit this information to the capital markets through their own publications. However, surveys and other research evidence have documented that the annual report is a vital, though not sufficient, source of information to analysts both in the US and elsewhere (e.g., Chang and Most, 1985; Vergoossen, 1993; Anonymous, 2000). Chang et al. (1983), for example, showed that the annual report was used as a basis for investment decisions.

In the same vein, Marston (1996), quoted by Holland (2005), analyzed investor relations departments. Her findings are based on postal questionnaires sent to the top 500 quoted European companies in 18 different countries in 2002, and a series of 19 interviews with investor relations personnel from six countries. One-to-one meetings were ranked most important by respondents, with telephone calls a close second. These were followed by (in order of importance), “roadshows”, providing feedback on analysts’ reports and answering e-mail queries. The results are consistent with Barker (1998) who found that “raw” data flowing directly from companies to investors and fund managers is more important than processed data generated by analysts. Barker (1998) concludes that the research literature has paid insufficient attention to the role of accounting information in direct communication between companies and fund managers. The importance of narratives and one-to-one contact also underlines the importance of language as an ingredient of the informational efficiency of markets. This is why we argue that language can be important to investors even if “fundamental information” (accounting numbers from financial statements) is accessible through financial databases such as Datastream<sup>®</sup>, Global<sup>®</sup>, Inf Financials<sup>®</sup> or Worldscope<sup>®</sup>.



## 2.2 Hypothesis development

Information asymmetry exists because some investors possess private information about a firm that is unavailable to other investors. One reason might be that corporate communication in a foreign language is more difficult for international investors and information intermediaries to understand, interpret and process because it requires more time and effort to extract and identify relevant information (see Lehavy et al., 2009). This creates an adverse selection problem, as informed investors may trade on their private information to the detriment of uninformed investors. Economic theory suggests that greater disclosure reduces information asymmetry (Diamond and Verrecchia, 1991). From an empirical point of view, Healy, Hutton and Palepu (1999) reported that when firms improved their disclosures, there was a resulting increase in stock return, institutional ownership and analyst following and a decrease in bid-ask spread and analyst forecast dispersion. Heflin, Shaw and Wild (2005) reported a negative association between disclosure quality and spread measures, while Brown and Hillegeist (2007) also found a negative relationship with the probability of informed trading.

This disclosure literature implicitly assumes that all disclosure is read and utilized by market participants. Contrary to this assumption, there is a large body of literature on the visibility of the firm and its impact on price. This literature draws on Merton (1987), which suggests that investors will only invest in firms they are familiar with. As a consequence, an increase in the size of a firm's investor base (i.e., the number of investors that are aware of the firm's existence) will reduce its cost of capital.

In this paper, we argue that issuing an ARE is a way for firms to increase their visibility to investors and financial analysts. Several factors underlie this positive association. First, English is a *lingua franca*: it is the world's second language (after Mandarin and together with Spanish) in terms of native speakers<sup>3</sup>. Second, English is the language of business: stock exchanges located in English-speaking countries represent 65% of the world stock market capitalization<sup>4</sup>, and 93% of financial analysts who are members of the CFA institute are located in English-speaking countries.<sup>5</sup>

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<sup>3</sup> Source: [http://en.wikipedia.org/wiki/List\\_of\\_languages\\_by\\_number\\_of\\_native\\_speakers](http://en.wikipedia.org/wiki/List_of_languages_by_number_of_native_speakers)

<sup>4</sup> Source <http://www.world-exchanges.org/statistics>

<sup>5</sup> See [www.cfa.institute.com](http://www.cfa.institute.com)

There is a growing volume of empirical literature which examines the visibility attributes that drive investment preferences, including international home bias (e.g., French and Poterba, 1991; Cooper and Kaplanis, 1994; Kang and Stulz, 1997), advertising intensity (Grullon et al., 2004), press coverage (Falkenstein, 1996), and presentations to analysts (Francis et al., 1997). The driving force behind the results found in all these studies is the informational advantage held by some market participants over others. However, an informational advantage for some agents implies nothing more than the existence of information asymmetry in the market. One way information asymmetry may be captured – or even mitigated – is an often used and cited proxy for informational advantage: “market proximity”. Market proximity can concern geographical, economic, industrial, and cultural characteristics and mainly leads to smaller bid-ask spreads – our proxy for information asymmetry. Culture and geographical proximity themselves are mainly influenced and connected by the existence of a common language. Various studies have explicitly linked the existence of a common language to trading behavior, portfolio allocation decisions, and information asymmetry. Tesar and Werner (1995), for example, focus on “language, institutional and regulatory differences and the cost of obtaining information about foreign markets” and suggest that “geographic proximity seems to be an important ingredient in the international portfolio allocation decision”. In their study on gross cross-border equity flows between 14 countries, Portes and Rey (2005) find that only a language dummy is a significant factor in certain specifications for asset trade, whereas dummies and other common variables in the goods trade literature such as “trading blocs”, “time and country specific dummies” and others remain insignificant. Sarkissian and Schill (2004) note that the studies of Gehrig (1993), Kang and Stulz (1997), Coval and Moskowitz (1999, 2001), and Hubermann (2001) all find that the cultural proximity as well as the geographic proximity of the market has an important influence on investor stockholding and trading. They report as their main result that there is more cross-listing activity across countries that share similar language or colonial ties, since there is lower information asymmetry. In the same vein, Grinblatt and Keloharju (2001a) document that investors are more likely to trade in stocks of firms that share (or at least communicate in) the same language as the investor, and have a similar cultural background. The reason for this is the greater information flow between market participants with the same language or historical ties. Grinblatt and Keloharju (2001a) point out that “if a company perceives that a large proportion of its shareowners prefer a particular language, the company may chose to communicate in that language”. According to Rauch (1999), common language and colonial ties should have the greatest (positive) effects on trading volume (and hence on bid-ask

spreads), and search costs – which can in our case be interpreted as translation costs – should form the greatest barrier to trade. Hau (2001b), in his study on transaction data from the Xetra trading system at the German Security exchange, finds that traders outside Germany in non-German-speaking locations face an information disadvantage, and trade less and with smaller profitability. He remarks that “the information barrier may be either linguistic or geographic in nature”. In a closely related study on the same dataset, Hau (2001a) expects that foreign investors are likely to use domestic intermediaries if they believe that domestic traders enjoy an information advantage which will benefit their own investment choice. Huberman (2001) summarizes the evidence by saying “Together, these phenomena provide compelling evidence that people invest in the familiar while often ignoring the principles of portfolio theory”. Altogether, these studies highlight the (potential) importance of the language a company communicates in and suggest that disclosure must be visible to be effective (in terms of capital market consequences). Publishing an ARE in non-English-speaking countries should have a positive impact on the international visibility of firms’ reporting, which should lead to a reduction in information asymmetry in the market. Therefore, our first hypothesis is the following:

**H1:** Firms adopting English in their annual report experience a reduction in information asymmetry.

As a second hypothesis, we focus on the analysts’ response to publication of an ARE, which can be a strategy to channel information through intermediaries such as financial analysts (Beaver, 1981) to increase firm visibility and attract investors. The literature on analyst following and the accuracy of analyst forecasts is huge (see, e.g., Baker, 2002; Ackert and Athanassakos, 2003; Coen et al., 2005; Malloy, 2005; Ali et al., 2007; Arya and Mittendorf, 2007; Aerts et al., 2008; Chang et al., 2008; Lehavy et al., 2009).<sup>6</sup> Most of the studies indicate that analysts prefer to follow large firms listed on major exchanges with lower performance volatility (O’Brien and Bhushan, 1990; Lang and Lundholm, 1996). Moreover, there is evidence that analyst following is impacted by institutional investor following (our third hypothesis) and voluntary disclosure, suggesting that there are opportunities to influence the likelihood of analyst following through these mechanisms (O’Brien and Bhushan, 1990; Lang and Lundholm, 1996).

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<sup>6</sup> For a review, see Ramnath et al. (2008).

Some of the most recent studies on analyst following even mention the possible effect of domestic analysts' informational advantages compared to foreign analysts, due to language knowledge and cultural proximity. Bae et al. (2008a) assume that the decision to follow firms is made based on the costs and benefits of following foreign firms. On the cost side they expect that "costs presumably include primarily the direct costs of acquiring information about a new firm". In their empirical tests they therefore include a dummy variable indicating the existence of a common language between analysts and the firm followed by these analysts. The results confirm their expectation: Foreign analyst following is greater when the firm's country and the analyst's country share a common language or colonial history. In Bae et al. (2008b), this finding is further refined not by looking at the existence of a "common language", but by focusing on the "English language" specifically. They assume that foreign analysts are likely to be fluent in English, and therefore expect these analysts "to be at a disadvantage with regard to firms in countries where English is not the main language". Ramnath et al. (2008) take a similar position and propose that future research might consider the effects of cultural differences across countries on analysts' decision processes and forecasts. Our paper differs from past literature by focusing on the firm's point of view rather than the analyst's point of view. Our second hypothesis addresses all these issues and is expressed as follows:

**H2:** Firms adopting English in their annual report increase their analyst following.

Finally, we examine whether foreign ownership depends on the reporting language. There is a large body of literature examining the firm characteristics associated with institutional investor ownership (e.g., La Porta et al., 1999; Bushee, 2001; Dahlquist and Robertsson, 2001; Ackert and Athanassakos, 2003; Doidge et al., 2009). These papers consistently find that institutions prefer larger firms that are listed on stock indexes and major exchanges. The possible interaction between language or cultural proximity and foreign ownership is less often mentioned in prior studies than liquidity and language proximity. In their study on trading behavior, Grinblatt and Keloharju (2001b) find that Finland-domiciled companies that publish their annual reports both in Finnish and Swedish are able to tap an abnormally large Swedish-speaking investor base, both in Finland and Sweden. They expect that "firms in other countries should be able to do the same to increase their investment appeal. For example, US companies, which generally publish their annual reports only in English, might be able to expand their investor base by publishing their annual reports also in, say Spanish and

Japanese”. Pagano et al. (2002) find that common language fosters “clustering” of institutions in countries that are geographically or culturally close to their country of incorporation. They believe this is mainly due to informational reasons. Kalev et al. (2008) compare the investor behavior of foreign and local investors on the Helsinki Stock Exchange. They expect and confirm “that information about single-listed stocks is more apparent to local investors who do not face language, distance or culture barriers”. Hence, foreign ownership is smaller for firms that do not communicate in English, since the informational disadvantage for foreign investors is larger than for companies publishing their accounts in English as well as their local language.

The company’s international visibility is positively affected by adopting the English language, a language that nearly everybody is able to understand. Our third hypothesis therefore is:

**H3:** Firms adopting English in their annual report enlarge their investor base.

### **3. Methodology, variable description and sample**

#### *3.1 Research design: the difference-in-differences (DD) methodology*

To test our hypotheses, we use a difference-in-differences (DD) setting, an empirical estimation technique commonly used in economics and, to a lesser extent, in the accounting and financial literature (see Daske et al., 2008). Let us take a hypothetical example where a firm decides to adopt English for external reporting purposes and publishes an ARE for 2005 (in the early months of 2006). Let us also assume that in the year the change becomes effective and known to interested parties (year 2006, called year 1 in our statistical treatments), an outcome variable (e.g., analyst following) increased by 50% compared to the year before the change becomes effective (year 2005, called year 0 in our treatments). In order to estimate the impact of the change on analyst following, we could simply do a “before and after” analysis and conclude that the adoption of an ARE is associated with a 50% increase in analyst following. The problem is that there could be an unrelated trend towards more analyst following over time, and it is impossible to know whether the firm’s decision to publish an ARE or the time trend caused this increase in analyst following.

One way to identify the impact of the “adoption” is to run a DD regression. If there is another firm that did not change its external reporting language, we could use it as a control to

compare the changes between English adopters and non-adopters between the two years. More precisely, we will run the regression:

$$\begin{aligned} \text{Economic Consequence} = & \beta_0 + \beta_1 \text{Treatment} + \beta_2 \text{Time} + \beta_3 \text{Treatment} \times \text{Time} \\ & + \beta_5 \text{Control variables} + \varepsilon \end{aligned} \quad [\text{Eq. 1}]$$

Where

- *Economic Consequence* is the economic consequence analyzed (analyst following for instance – we also use information asymmetry and foreign investor base);
- *Treatment* is a dummy coded 1 if the firm adopted English at some point in time, 0 otherwise;
- *Time* is a time dummy coded 1 from the year the change becomes effective (i.e., one year after the period concerned by the annual report, 2006 for the 2005 annual report, in our example) and 0 until the year the change becomes effective;
- *Treatment*  $\times$  *Time* is the interaction of the *Treatment* dummy and the *Time* dummy;
- *Control variables* vary across the dependent variables. These variables are included to control factors that are associated with the economic consequence analyzed, other than time and language. These variables are presented in section 3.3.

This setting allows us to test the economic consequences of using English. Under this approach, we compute our proxies before and after the adoption of English for our treatment firms and for a control group (determined with a propensity score matching procedure – see below). If the adoption of English has economic consequences, we expect to see differences in the economic consequences between the treatment and control groups after the adoption. The use of a control group and the computation of time differences (before and after the change) provide natural controls for any confounding factors.

The following table indicates the predicted value of an economic consequence for each of the possible scenarios.

Predicted <i>Economic Consequence</i>	Time = 0	Time = 1
Treatment = 0	$\beta_0$	$\beta_0 + \beta_2$
Treatment = 1	$\beta_0 + \beta_1$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$

$\beta_0$  is the baseline average for non-adopters before the adoption,  $\beta_1$  represents the differences between the two groups in year 0 (before the adoption),  $\beta_2$  represents the time

trend in the control group (non-adopters), and  $\beta_3$  represents the difference in the changes over time. Assuming that both firms have the same analyst following trend over time, we have now controlled for a possible time trend effect. We can then identify the true impact of adoption of English on analyst following ( $\beta_3$ ).

The usual “good” DD approach relies on a natural experiment, i.e., some change was expected to affect treatment for one group more than another, and the two groups should not otherwise differ. For this to work well, the natural experiment should be exogenous (i.e., the change must not be a reaction to behavior) and unlikely to induce people to “play the system” and change their behavior in unpredictable ways. In other words, the choice of a matching sample is a critical step in our methodology (see below).

Under this DD procedure, a significant  $\beta_3$  can be interpreted in at least three different ways. A first interpretation is that issuing an ARE is indeed associated with economic consequences. A second possible explanation is that an ARE contains more information than a local language annual report. Under this interpretation, a significant  $\beta_3$  would not mean that using English has economic consequences, but that increased disclosure (in the English version of the annual report) has economic consequences. However, past research suggests that firms do not “take advantage” of the English version to report additional information and increase transparency. Campbell et al. (2005), for instance, carry out a content analysis of voluntary disclosure in an international comparison context. They examine the validity of volumetric comparison by recording word and sentence counts, using both original German documents and their English translations published by German companies themselves. They find that the English rendering of German environmental narrative is generally faithful to the German, suggesting that companies do not deliberately discriminate by reporting jurisdiction. In other words, we can study the use of English *per se* because there is no difference in content between the local-language annual report and the ARE.

A third possibility is that the significance of  $\beta_3$  is due to self-selection. Factors associated with the issuance of an ARE could be also associated with our outcome variables, creating a self-selection issue. We will see below in Table 1, Panel B, that English adopters are smaller and have more growth opportunities. Since these factors are potentially correlated with the economic consequences analyzed, we implement a propensity score matching (PSM) procedure initially proposed by Rosenbaum and Rubin (1983).

### 3.2 Research design: the propensity score matching (PSM) procedure

This methodology is becoming increasingly popular in the accounting and finance literature (see Armstrong et al., 2009; Choi and Jiang, 2009; Clatworthy et al., 2009) and involves two stages.

In the first stage, we estimate the probability of publishing an additional ARE with a Logit model. We are thus able to identify control firms that (1) have the same predicted propensity to use English as our treatment firms (adopters), and (2) continue to use the local language only for external reporting. In the second stage, we estimate equation 1 for treatment firms (adopters) and control firms (firms that continue to use only the local language but show the same propensity as our sample firms to issue an ARE). Propensity score matching essentially estimates each firm's propensity to make a binary choice as a function of observables and matches firms with similar propensities. As Rosenbaum and Rubin (1983) showed, if the propensities were known for each firm year, they would incorporate all the information about possible self-selection issues and propensity score matching could achieve optimal efficiency and consistency. In practice, the propensity must be estimated and selection is not only on observables, so the estimator may be both biased and inefficient.

At the general level, we hypothesize the decision to issue an ARE to be driven by external financing needs. In other words, the issuance of an ARE should be related to the desire to attract new investors. More precisely, we expect the following variables to influence the likelihood to use an ARE: firm size, profitability, growth opportunities, leverage, level of international sales, the ownership structure and the issuance of debt or equity. We develop hereafter the rationales of including those variables in our propensity score procedure.

Bonaccorsi (1992) develops a theoretical analysis of the obstacles preventing small firms' internationalization: limited resources, lack of scale economies and high risk perception regarding international operations. Consistent with this framework, we expect the benefits of an ARE to increase with *Firm size*.

All other things being equal, a highly profitable firm generates a large free cash flow. This lowers the need for external financing (Higgins, 1977). If the annual report is used to increase the visibility of the firm, then the need for an ARE should decrease with ROA. The publication of an ARE should show a negative association with *Return on assets*.

Prior research has divided firm value into two components (Myers, 1977): the assets-in-place, which are valued independently of the firm's future investment opportunities, and the growth options, which are valued on the basis of the firm's future investment decisions. As it



depends on future discretionary expenditures by managers, the value of growth options is subject to far more uncertainty than the value of assets-in-place. Myers (1977) notes that firms with abundant growth opportunities are more likely to be in need of external financing to fund current and future profitable projects. Reporting in English as well as the local language may facilitate fund-raising by enlarging the base of potential investors. This is why the publication of an ARE should be positively related to *Growth opportunities*.

Myers and Majluf (1984) show that firms may refuse to issue stock, sometimes choosing to pass up valuable investment opportunities. Their findings are based on the assumptions that (1) managers know more about the firm's value than potential investors and (2) managers act in the interest of existing shareholders, but also that (3) investors interpret the firm's actions rationally. This model implies that highly-leveraged firms will not seek external equity financing. We expect the use of English as a second reporting language to be linked to the desire to raise equity. Thus, the publication of an ARE is expected to be negatively related to *Leverage*.

According to Choi (1991), business internationalization leads the firm into a faster-changing and more competitive context. Raffournier (1995) states that companies are induced to comply with the usual practices of countries in which they operate. "The more international the operations of a firm, the larger is the inducement" (1995, p. 266). Many previous studies in international business use international sales as an indicator for the degree of internationalization of a firm (Sullivan, 1994). Companies with international sales should need more than others an ARE. Thus, the publication of an ARE is expected to be positively related to the degree of *Sales internationalization*.

Past research (Dahlquist and Robertsson, 2001) showed that institutional shareholders invest less in closely held firms. If the adoption of an ARE is related to the desire to attract new shareholders, then we should observe the issuance of an ARE to be negatively associated with the proportion of *Closely held shares*.

Finally, we expect the likelihood to issue an annual report in English to be positively associated with the issuance of debt or equity in the future. This is why we anticipate a positive and significant coefficient on *Future debt increase* and *Future equity increase*.

In addition to these eight variables, we also include industry and year dummies to control for fixed factors correlated with industry or country. We estimate the following Logit for each country:

$$\begin{aligned} \text{Log} \left[ \frac{\text{Pr}(\text{ARE} = 1)}{1 - \text{Pr}(\text{ARE} = 1)} \right] = & \alpha_0 + \alpha_1 \text{Size} + \alpha_2 \text{Return} + \alpha_3 \text{Growth opportunities} \\ & + \alpha_4 \text{Leverage} + \alpha_5 \text{Foreign sales} + \alpha_6 \text{Closely held shares} + \alpha_7 \text{Future equity increase} \quad [\text{Eq. 2}] \\ & + \alpha_8 \text{Future debt increase} + \sum_k \alpha_{9,k} \text{Industry} + \sum_k \alpha_{10,k} \text{Year} \end{aligned}$$

To estimate Equation 2, we use the global reporting universe described later in this section. Panel A of Table 1 reveals that the sample size is 10,278 firm-year observations, 48.8% classified as publishing an ARE and 51.2% as publishing only in local language.

### 3.3 Variable description

Variable descriptions are presented in Appendix 1.

#### 3.3.1 Dependent variables

In studying the economic consequences of English adoption, we use proxies for information asymmetry, analyst following and ownership structure.

Our first dependent variable is the bid-ask spread, which is a commonly used proxy for information asymmetry (e.g., Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000; Daske et al., 2008). Our next proxy is related to analyst following. Since analysts serve as information intermediaries, their presence should tend to increase transparency. Our third measure of economic consequences is related to the internationality of ownership. Data on ownership are provided by Thomson Ownership. This database indicates the country of residence (the “country” column) as well as the number of shares owned by each shareholder. We compute three measures of the internationality of ownership. For each measure, we count the number of “Foreign owners” (FO) for each firm-year observation.<sup>7</sup> FO are defined as (1) owners from a country whose language is different from the one used in the firm’s country of incorporation; (2) all owners from a country different from the firm’s country of incorporation; (3) owners from an English-speaking country. Consider for instance a German firm, with four shareholders: one German, one Austrian, one Italian, and one English. Our three metrics set FO respectively at 2 (as Austria’s language is German), 3, and 1. For the sake of simplicity, we report only the first measure.

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<sup>7</sup> We did not use the alternative method of computing the total shareholdings of non-local owners, because we found inconsistencies in the continuity of this data as provided by Thomson Ownership.

### 3.3.2 Control variables

For each dependent variable, we add control variables in equation 1. In all regression models, we include industry-, country-, and year-fixed effects. Thus, our specifications control for differences in countries' adoption rates as well as time trends.

In the spread regression, we control for firm size, return variability, share turnover (Chordia et al., 2000) and international standards (Daske et al., 2008). In the analyst following regression, we control for *Size*, *Return on assets* and *Growth opportunities*. Variable descriptions are presented in appendix. We expect bigger firms to be more followed by analysts, as well as firms with higher profitability and growth opportunities. In the foreign ownership regression, we control for *International standards*, *Size*, *Financial leverage*, *Return on assets*, and *Growth opportunities* (Dahlquist and Robertsson, 2001).

### 3.4 Sample

To test our hypotheses, we create a sample of firms that have adopted dual financial reporting (local language plus English language). The primary data source is the "Global reports database" (GR database) which contains all annual reports, whatever their language. From this database, we selected all firms from non-English speaking countries which issued an annual report (in any language) from 2004 to 2007.

#### **Insert table 1 about here**

As shown in Table 1, Panel A, from this initial database of 3,236 firms (10,278 firm-year observations on the 2004-2007 period), we analyzed the external language(s) used for each firm-year observation (Local language/English/Both). Even if the choice of language is independent of the decision to adopt different accounting policies<sup>8</sup>, we believe that companies listed in the US or the UK will be tempted to publish an ARE, as it might facilitate understanding of their financial statements by US or UK investors. Consequently, we have excluded cross-listed firms from our sample.<sup>9</sup> Out of the 10,278 observations, 48.8% use English in their annual report, whereas 51.2% use only their local language in their annual report.

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<sup>8</sup> For example, foreign companies listed in the US must prepare a 20-F form, which is obviously written in English. However, the annual report of these companies (which is a separate document from the 20-F form) may still be published in their local language.

<sup>9</sup> To test the robustness of our results with regard to this hypothesis, we run the basic model including companies listed in the US or UK. Findings are robust to the inclusion of cross-listed firms from our sample.

We were able to identify 166 firms which adopted dual reporting according to the Global Reports database between 2004 and 2007. We hand collected and checked languages used in annual reports before and after the change date as identified from the Global Reports database. Annual reports were collected through the [www.infinancials.com](http://www.infinancials.com) website, or if unavailable, through the firms' websites.

In Table 1, Panel B, we provide descriptive statistics on financial data for the universe (10,278 firm-year observations), for the treatment sample (556 firm-year observations) and for the control sample (1,269 firm-year observations). On average, mean (median) firm size, measured as the log of sales, for treatment firms is 4.324 (4.556) and appears to be smaller than for the entire universe: 4.506 (4.693). This difference is significant in mean as in median. Mean return on assets (ROA) is 2.4% (median: 3.7%) for the treatment group. These figures are statistically indistinguishable from the mean ROA (1.7%) and median ROA (3.6%) for all listed firms. The value of the firm represents on average (median) 1.961 (1.465) times the value of the capital employed (equity plus long-term debt), compared to 1.672 (1.306) times for all listed firms. Firms that adopted an ARE appear to have more growth opportunities than non-adopters (p-value of the t-test = 0.000, p-value of the Mann-Whitney U test = 0.000). No difference can be found in terms of leverage: its mean (median) value is 52.6% (55.0%) for the ARE adopters, which is comparable with the 51.2% (53.6%) for all listed firms. Surprisingly, firms from our treatment group exhibit a lower proportion of foreign sales (mean of 17.6%) than the entire universe (21.6%). However, intra industry variation in the proportion of ARE may explain this finding. Firms with an ARE do not differ from the entire universe in terms of ownership structure: on average the closely held shares represent 36.3% of the total number of shares versus 36.2% for the whole universe. Firms that adopt an ARE seem to lever funds either through equity or a debt offerings more frequently than other firms. On average, 57% (79%) of firms with an ARE issued equity (debt) during the period versus 44.2% (73.9%) for other firms. Both proportions statistically and economically differ across sub samples. To summarize, firms with an ARE are smaller, have more growth opportunities, less international sales and more funding needs than the average listed firm in their respective countries.

Table 2 provides descriptive statistics for our treatment sample. Panel A reports the country of origin and Panel B the industry classification of our sample.

#### **Insert Table 2 about here**

Panel A reveals that sampled firms come from 16 different countries. Six countries (Germany, Sweden, Italy, Norway, Denmark and France) represent more than two thirds of

the observations. Those six countries have relatively well-developed capital markets, which is of help in the computation of information asymmetry measures; yet across and within these markets firms are likely to differ substantially in terms of transparency and liquidity. Firms also differ in terms of dominant local language, with 13 different languages used in the sampled countries.

Panel B of Table 2 reveals that three sectors (Manufacturing, Finance and Service) account for more than 75% of the observations. This proportion differs from the distribution of all listed firms, which suggests that industry may be an important determinant of the decision to use English in the annual report.

## 4. Empirical findings

To test our hypotheses, we use a Difference-in-Differences (DD) setting. The treatment group consists of all English adopters. To be included in the “control group”, a firm must have a similar predicted probability to adopt English as the treatment firms.

### 4.1 First stage of the propensity score matching

We first report the results of the first stage of the propensity score matching. Equation 2 was estimated country by country to determine the likelihood of publishing an ARE for each firm-year observation. As we cannot report the regression results for each country, Table 3 reports the estimated coefficients for the whole sample, to demonstrate the economic intuition of our model.

#### **Insert table 3 about here**

Overall, the model is significant ( $\chi^2 = 2052.846$ ,  $p=0.000$ ) and correctly classifies 74.5% of the observations. This percentage is significantly higher than in a naïve model (no firms issue an ARE) that would have correctly classified 51.2% of observations (see Table 1, Panel A). All coefficients are significant. The coefficient on *Size* is positive (coeff = 0.594,  $z=26.331$ ), suggesting that large firms tend to issue an ARE more frequently. This finding is consistent with intuition. As expected, the coefficient on *Return* is negative (coeff = -0.695,  $z=-3.872$ ), suggesting that profitable firms tend to issue an ARE less frequently. Firms with high *growth opportunities* tend to issue an ARE more frequently (0.179,  $z=7.670$ ), whereas the opposite is true for the more highly-leveraged firms (coef = -1.428,  $z=-11.005$ ). These findings are consistent with the idea that firms use English in order to increase their visibility

and thus raise funds. Consistent with our expectation, the more international the sales, the more likely the issuance of an ARE as indicated by the positive and significant coefficient on *Foreign sales* (coef = 0.016,  $z=15.353$ ). The ownership structure of the firm is associated with the likelihood of issuing an ARE: the coefficient on *Closely held shares* is negative (-0.005) and significant ( $z=-5.819$ ) consistent with the idea that closely held firms are not prone to use English in their annual report. Finally, firms that will issue debt or equity in the future, tend to issue more frequently ARE as the coefficient on *Future equity increase* and *Future debt increase* are positive (0.352 and 0.203 resp.), and significant (resp.  $z=6.855$ ,  $z=3.523$ ). Overall, our findings suggest that firms issue an ARE when they need to raise money, or when exposed to demands from external parties (such as investors or customers).

#### 4.2 Difference-in-Differences regressions

The treatment group consists of all English adopters. For each treatment group firm, we choose three control group firms that must meet three cumulative conditions. First, control firms need to be located in the same country. Second, we require control firms to have a similar propensity to use English to the treatment firm the year preceding the adoption of English. Finally, controls firms must not issue an ARE either before or after the change observed for our treatment firm.

Table 4 reports our findings with this set of control firms. Table 4 consists of 3 panels: Panel A (findings for H1 Information asymmetry), Panel B (findings for H2 Analyst following) and Panel C (findings for H3 Foreign ownership).

#### **Insert table 4 about here**

In each panel, we present the results of the following regression [Eq. 1]<sup>10</sup>:

$$\begin{aligned} \text{Economic Consequence} = & \beta_0 + \beta_1 \text{Treatment} + \beta_2 \text{Time} + \beta_3 \text{Treatment} \times \text{Time} \\ & + \beta_s \text{Control variables} + \varepsilon \end{aligned}$$

The main coefficient of interest is the coefficient  $\beta_3$  which translates the value of the effect of the adoption of English after controlling for time effects and factors that affect all comparable firms.

Panel A tabulates findings for the bid-ask spread, our proxy for information asymmetry. Coefficient  $\beta_1$  is positive (0.963) and significant ( $p=0.000$ ), which implies that there is a

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<sup>10</sup> Observations are pooled three years before (after) the adoption of English, and we compute the mean economic consequence before (after) the adoption of English.

difference between the treatment and control sample before the adoption of English. More precisely, it implies that the treatment group suffered more from information asymmetry than the control group. Coefficient  $\beta_2$  is negative (-0.011) and insignificant ( $p=0.902$ ), which shows that there is no difference between the control sample before and after the adoption. The  $\beta_3$  coefficient is negative and significant (-0.096,  $p=0.021$ ). This means that, after controlling for time effects and factors that affect all firms, the adoption of English is associated with lower information asymmetry. In other words, by adopting English, firms can catch up around 10% of their bid-ask spread gap compared to the control group. Control variables are usually significant and consistent with prior literature. *International standards* is negative (-0.140) and marginally significant ( $p=0.142$ ) consistent with (see Daske et al., 2008) who find a modest average effect of IFRS adoption on their proxies of information asymmetry. When comparing the magnitude of the coefficients on *International standards* and *Treatment  $\times$  Time*, it appears that the effect of adopting language is far from being trivial as it represents the two thirds (0.096/0.140) of the effect of adopting higher quality accounting standards. Coefficients on *Firm size* and *Share turnover* are negative and significant. Consistent with intuition, large firms, and firms with frequently traded shares exhibit less information asymmetry. Finally, firms with volatile returns suffer from more information asymmetry.

Findings for analyst following are presented in Panel B. Coefficient  $\beta_1$  (0.224) is positive and significant ( $p=0.000$ ), which means that the treatment group has more analyst following than the control sample before the adoption. Coefficient  $\beta_2$  is insignificant ( $p=0.612$ ), which shows that there is no difference between the control sample before and after the adoption. More importantly, the  $\beta_3$  coefficient is positive and significant (0.108,  $p=0.063$ ). This means that, after controlling for time effects and factors that affect all firms, the adoption of English translates into an increase of 10.8% of the number of analyst that follow the firm. Control variables are usually significant and consistent with prior literature: coefficients on *Size*, *Return on assets* and *Growth opportunities* are positive and significant.

Panel C tabulates findings for foreign ownership. Coefficient  $\beta_1$  (-0.002) is not significant ( $p=0.877$ ), which shows that there is no difference between the treatment and control sample before the adoption. Coefficient  $\beta_2$  is negative and insignificant ( $p=0.189$ ), which shows that there is no difference between the control sample before and after the adoption. More importantly, the  $\beta_3$  coefficient is positive and significant (0.067,  $p=0.003$ ).

This means that, after controlling for time effects and factors that affect all firms, the adoption of English translates into a 6.7 point increase in the number of foreign owners. Control variables are usually significant and consistent with prior literature (see Dahlquist and Robertsson, 2001) with the notable exception of *International standards* that appears to be insignificant, whereas Covrig et al. (2007) showed that the voluntary adoption of IAS/IFRS is associated with a lower home investment bias. Note however, that our sample include mandatory IAS/IFRS adopters and past literature showed that benefits to the transition to IFRS can be confined to early adopters (see Christensen et al., 2008).

Globally, all three panels are consistent with the hypotheses that the adoption of English is associated with lower information asymmetry, greater analyst following and higher foreign ownership. Our findings are also consistent with the idea that firms try to make up for a lack of visibility by using English for their external reporting purposes.

## **6. Conclusions and implications**

In this paper, we argue that the language used in the annual reports is a crucial ingredient of the firm's visibility. Past literature has stressed the importance of accounting harmonization, suggesting that if the "language of business" is unified then information asymmetry should decrease. This view has received considerable attention over the last twenty years from academics (Biddle and Saudagaran, 1989; Leuz and Verrecchia, 2000; Covrig et al., 2007; Iatridis, 2008). Nonetheless, the association between accounting harmonization and positive economic consequences relies heavily on the assumption that market participants are able to read and understand any set of financial statements as long as they are governed by the same accounting rules. In practice, the first barrier (before we even reach the question of accounting standards) to understanding and comparing financial statements and increasing transparency is the language barrier. In this respect, using English for external reporting purposes is the only way to address any outsider of the firm easily and directly, irrespective of their nationality, and to reduce the costs of information acquisition by making the firm's financial statements more accessible for investors and analysts. In this paper, we set out to analyze and assess the economic consequences of using English as an external reporting language for firms from non-English speaking countries. We test the relationship between publishing an annual report in English and several measures of information asymmetry, and analysts' and investors' behavior.



We use a sample of “adopter” firms that issued an ARE for the first time. This sample is drawn from the Global Reports database, which identifies the language used by firms in their annual reports. From this initial database of 3,236 firms (10,278 observations), we identify 166 firms which published an ARE in addition to their local language report.

Our findings are consistent with the idea that issuing an ARE (in addition to the local language) reduces information asymmetry, and increases analyst following and foreign investor ownership, after controlling for endogeneity. This paper thus contributes to the literature on market participants’ responses to firms’ communication policy and disclosure patterns. While prior literature has identified the use of the English language as a possible explanation for various phenomena observed in capital markets (home bias, institutional ownership, trading behavior etc.), our paper is the first to directly address the question of the possible economic consequences of issuing an annual report in English.

## APPENDIX 1

### DESCRIPTION OF VARIABLES

Variable	Description	Source
<b>Dependent variables</b>		
<i>Analyst following</i>	= Analyst following = $\ln(1 + \# \text{ of analysts})$ .	IBES through WRDS
<i>Bid-ask spread</i>	= Yearly median value of the absolute value of the daily bid-ask spread scaled by the mid point between the bid and ask price.	Datastream (DS.Bidprice, DS.Askprice)
<i>Foreign ownership</i>	= Number of “foreign” investors over the total number of investors, as identified in the database. We define a “foreign” investor as an investor from a country whose language is different from the one used in the firm’s country of incorporation.	Thomson Ownership (Thomson Financial)
<b>Independent variables</b>		
<i>Closely held shares</i>	= $(\text{Number of Closely Held Shares} / \text{Common Shares Outstanding}) \times 100$	Worldscope (WS. CloselyHeldSharesPct)
<i>Firm size</i>	= Market value of equity measured as the stock price times the number of shares outstanding (in US\$ millions).	Worldscope (WS.marketcap)
<i>Foreign sales</i>	= $\text{International Sales} / \text{Net Sales or Revenues} \times 100$ Firms with missing data are assumed not to have international sales.	Worldscope (WS.ForeignSalesPctSales)
<i>Future debt increase</i>	= Dummy variable coded 1 if the firm has a debt increase superior to the median debt increase of the sample in the next two years, and 0 otherwise.	Worldscope (WS.TotalLiabilities)
<i>Future equity increase</i>	= Dummy variable coded 1 if the firm has a equity increase superior to the median equity increase of the sample in the next two years, and 0 otherwise.	Worldscope (WS.CommonStock)
<i>Growth opportunities</i>	= $(\text{Market value} + \text{Total debts}) / \text{Assets}$ (simplified version of the definition provided by Klein (2002)). Data winsorized at 0.01.	Datastream: (DS.MarketValue), Global (Standard and Poor’s): (mnemonic: [MKVAL + DT]/AT), Infiniticals: (Market capitalization: code 11937, Total debts: code 54022), Worldscope (Thomson Financial): (WS.TotalAssets, WS.TotalDebt).
<i>Industry</i>	= Dichotomous variables used to represent different industries at the two-digit SIC code level: Agriculture (01-09), Mining-construction (10-17), Manufacturing (20-39), Transportation (40-49), Trade (50-59), Finance-Insurance (60-67), Services (70-89), Public administration (91-99).	Infiniticals (SIC sector code: code 20004), Worldscope (WS.PrimarySICCode). Classification: <a href="http://www.siccode.com">www.siccode.com</a>
<i>International standards</i>	= Dummy variable coded 1 if the firm adopts IAS/IFRS or US GAAP and zero otherwise	Worldscope (WS.acctgstdfollowed)

<i>Leverage</i>	=	Total debt/total assets ratio at year-end. Data winsorized at 0.01.	Global: (mnemonic: [DT/AT]), Infinancials: (codes: 54022/53077), Worldscope: (WS.TotalAssets, WS.TotalDebt).
<i>Return</i>	=	Income before extraordinary items/Total assets. Data winsorized at 0.01.	Global: (mnemonic: ROA), Infinancials: (code: 5020), Worldscope: (WS.ReturnOnAssets),.
<i>Return variability</i>	=	Return variability is computed as annual standard deviation of monthly stock returns. We compute return variability beginning in month -2 through month +10 relative fiscal year end. We use the log transformation of this measure to mitigate the use of outliers.	Datastream (DS.index)
<i>Sales</i>	=	Natural logarithm of the sales for the year.	Global: (mnemonic: SALE), Infinancials: (code: 53002), Worldscope: (WS.Sales).
<i>Share turnover</i>	=	Accumulated US\$ trading volume during the year divided by market value of outstanding equity. We compute return variability beginning in month -2 through month +10 relative fiscal year end. We use the log transformation of this measure to mitigate the use of outliers.	Datastream (DS.volume)

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**Table 1****Sample selection and descriptive statistics**

See Appendix 1 for a description of variables.

In Panel A, the addition of firms (A) and firms (B) is higher than the total number of firms (3,236) because some firms decided to publish an ARE for the first time during the period.

Observations to compute propensity scores (PS) in section 4 are taken from sub-samples A and B. For each “Treatment group” firm in section 4, we choose three “Control group” firms that must: (1) be located in the same country, (2) have a similar propensity to use English to the treatment firm the year preceding the change to English, (3) not issue an ARE either before or after the change of our treatment firm.

**Panel A: Sample selection**

	<b>Number of Firm-Year Observations</b>	<b>%</b>	<b>Number of Firms</b>
Total number of annual reports stated in Global Reports (Infinancials) with available financial data (excluding cross-listed firms)	10,278		3,236
Split between:			
- Number of companies that issue an annual report in English (at least once over the period) (A)	5,015	48.8	1,811
- Number of companies that do not issue an annual report in English (B)	5,263	51.2	2,069
Number of adopters* with available data			166
*“Adopter”: company deciding for the first time to publish an English version of its annual report, in addition to the local language version.			

## Panel B: Descriptive statistics of financial data

See Appendix 1 for a description of variables.

	N	Mean	Median	N	Mean	Median	N	Mean	Median	p-value (t-test)	p-value (MW U-test)	p-value (t-test)	p-value (MW U-test)
	(Universe)			(Treatment)			(Control)			(Treatment vs Universe)		(Treatment vs Control)	
Sales	10,278	4.506	4.693	556	4.324	4.556	1,269	4.414	4.503	0.046	0.010	0.353	0.626
Return	10,278	0.017	0.036	556	0.024	0.037	1,269	0.017	0.032	0.275	0.182	0.367	0.054
Growth opportunities	10,278	1.672	1.306	556	1.961	1.465	1,269	1.555	1.215	0.000	0.000	0.000	0.000
Leverage	10,278	0.512	0.536	556	0.526	0.550	1,269	0.510	0.524	0.169	0.167	0.194	0.129
Foreign sales	10,278	0.216	0.000	556	0.176	0.000	1,269	0.185	0.000	0.001	0.002	0.515	0.867
Closely held shares	10,278	0.362	0.361	556	0.363	0.365	1,269	0.345	0.302	0.968	0.923	0.285	0.129
Future equity increase	10,278	0.442	0.000	556	0.570	1.000	1,269	0.451	0.000	0.000	0.000	0.000	0.000
Future debt increase	10,278	0.739	1.000	556	0.790	1.000	1,269	0.749	1.000	0.005	0.005	0.059	0.059

**Table 2****Descriptive Statistics of the Treatment Sample**

See Appendix 1 for a description of variables.

**Panel A: Split of Adopters by Country and Languages Spoken**

Country name	N	%	Main language spoken
Austria	4	2.4	German
Belgium*	2	1.2	Dutch
Denmark	14	8.4	Danish
Finland	3	1.8	Finnish
France	14	8.4	French
Germany	39	23.5	German
Greece	13	7.8	Greek
Italy	16	9.6	Italian
Netherlands	5	3.0	Dutch
Norway	15	9.0	Norwegian
Poland	5	3.0	Polish
Portugal	5	3.0	Portuguese
Spain	3	1.8	Spanish
Sweden	21	12.7	Swedish
Switzerland*	4	2.4	German
Turkey	3	1.8	Turkish
Total	166	100.0	

\*Multi-lingual countries: For Belgium, we chose the language spoken by the majority of the population: Dutch (Flemish) (see <http://www.nationmaster.com/country/be-belgium/lan-language>), and for Switzerland, we chose German (see [http://www.swissworld.org/en/people/language/language\\_distribution](http://www.swissworld.org/en/people/language/language_distribution)).

**Panel B: Split of Adopters by Industry**

Industry	N	%
Mining-construction	7	4.2
Manufacturing	49	29.5
Transportation	14	8.4
Trade	17	10.2
Finance-Insurance	36	21.7
Services	42	25.3
Public administration	1	0.6
Total	166	100.0

**Table 3****Results of the Logit Regression in Preparation of the Propensity Score Matching**

See Appendix 1 for a description of variables.

A logit regression is run for each country. The dependent variable is coded 1 if the firm issues an annual report in English, 0 otherwise. As we cannot display the tables for all the countries, this table presents the results for a logit regression ran on all the firms with available data (N = 10,278).

	Predicted signs	Coefficients	z	p
Size	+	0.594	26.331	0.000
Return	-	-0.695	-3.872	0.000
Growth opportunities	+	0.179	7.670	0.000
Leverage	-	-1.428	-11.005	0.000
Foreign sales	+	0.016	15.353	0.000
Closely held shares	-	-0.005	-5.819	0.000
Future equity increase	+	0.352	6.855	0.000
Future debt increase	+	0.203	3.523	0.000
Industry effects		Included		
Year effects		Included		
Country effects		Included		
Constant		-1.710	-3.300	0.001
Number of observations		10,278		
Chi square		2052.846		
p(chi2)		0.000		
Pseudo R-square		0.253		
Nagelkerke R-square		0.394		
Pct classified in sample		74.518		

**Table 4**

Difference-in-Differences Analysis of Economic Consequences around the Change to English  
(with a Propensity Score Matching)

The difference-in-differences analysis is based on all companies issuing an English version of their annual report and randomly selected control companies with data available over the period. Control firms are comparable with treatment firms on the basis of a propensity score matching (same country, same year). The table reports regression results for the dependent variables, independent variables and control variables. We use three dependent variables in the analyses. Each panel displays the results of the three analyses we run: (A) *Bid-ask spread* is the yearly median value of the absolute value of the daily bid ask spread scaled by the mid point between the bid and ask price. (B) *Analyst following* equals  $\ln(1 + \# \text{ of analysts})$ . (C) *Foreign ownership* is the number of “foreign” investors over the total number of investors, as identified in the Thomson Ownership database. We define a “foreign” investor as an investor located in a different country where the language is different from the one used in the country of the company in which she invests. We assess the statistical significance of the difference-in-differences values by using the  $\beta_3$  coefficient for the following regression:

$$\text{Economic Consequence} = \beta_0 + \beta_1 \text{Treatment} + \beta_2 \text{Time} + \beta_3 \text{Treatment} \times \text{Time} \\ + \beta_s \text{Control variables} + \varepsilon$$

where *Treatment* is a dummy variable coded one if the firm is a treatment firm (company which issued an ARE for the first time) and zero otherwise, *Time* is a dummy variable coded one if the year is at least one year after the change (first publication of an ARE), and zero otherwise, and *Treatment\*Time* is an interaction variable. Note that all standard errors are clustered (White, 1980). See Appendix 1 for a description of variables.

	Panel A: Bid-ask spread		Panel B: Analyst following		Panel C: Foreign ownership	
	coef.	p-value	coef.	p-value	coef.	p-value
Treatment	0.963	0.000	0.224	0.000	-0.002	0.877
Time	-0.011	0.902	0.021	0.612	-0.022	0.189
Treatment $\times$ Time	-0.096	0.021	0.108	0.063	0.067	0.003
Size	-0.449	0.000	0.174	0.000	0.027	0.000
International standards	-0.140	0.142			0.002	0.884
Return variability	0.075	0.002				
Share turnover	-0.201	0.025				
Lag return on assets			0.001	0.108		
Growth opportunities			0.086	0.000		
Leverage					0.084	0.003
Return					-0.001	0.020
Growth opportunities					0.022	0.000
Country effects	Included		Included		Included	
Industry effects	Included		Included		Included	
Year effects	Included		Included		Included	
Number of observations	2,950		3,346		2,555	
F	122.11		34.960		66.544	
Prob>F	0.000		0.000		0.000	
R-square	0.693		0.287		0.180	
Adjusted R-square	0.612		0.279		0.167	